No. 774,882. PATENTED NOV. 15, 1904.

C. E. JEWELL.

TEMPERATURE REGULATOR.

APPLICATION FILED AUG. 20, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

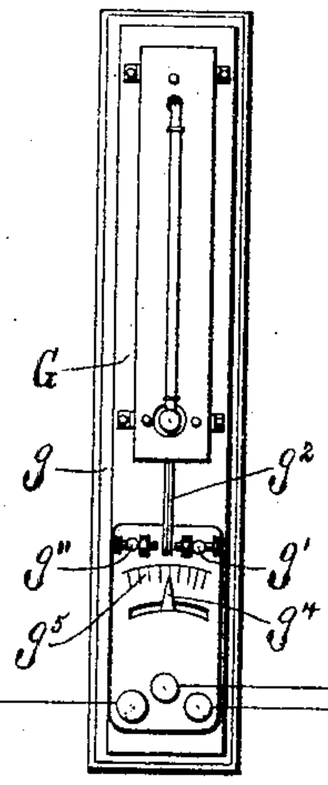
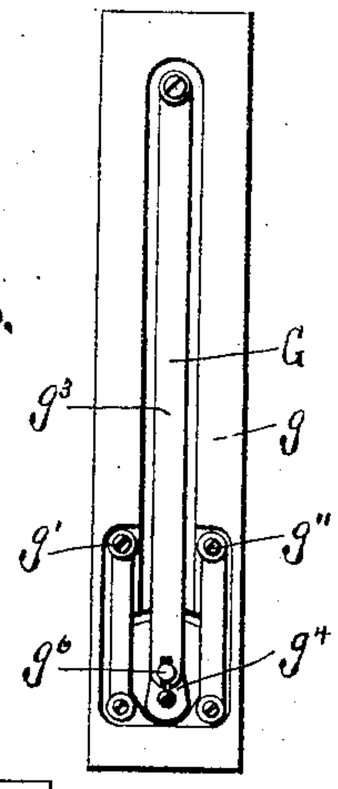


Fig. 2.



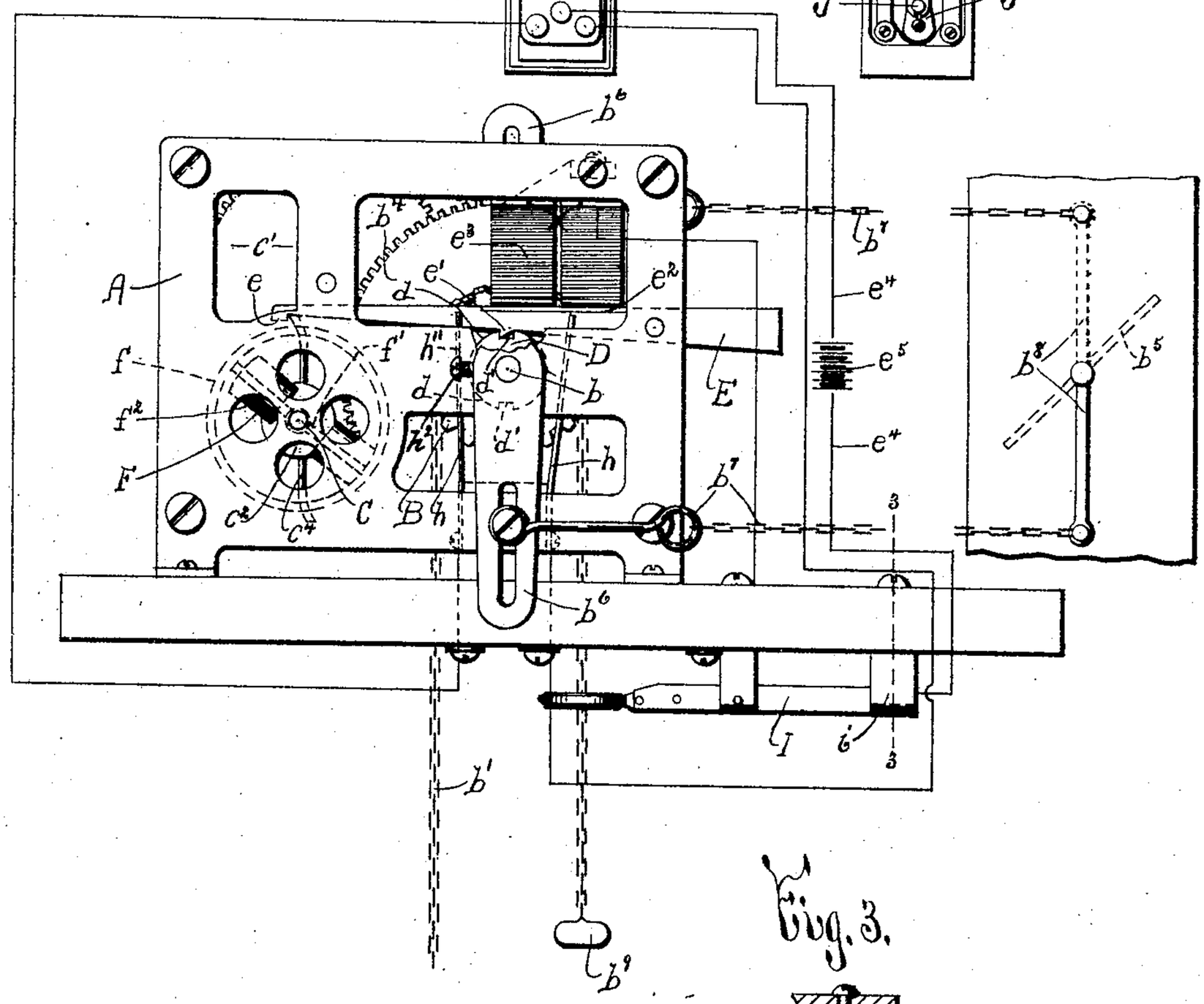
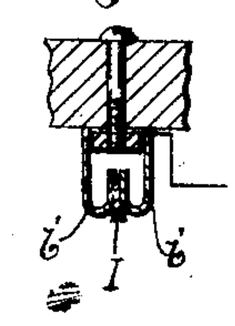
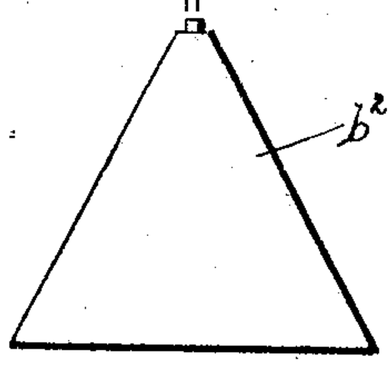


Fig. 3.





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TEMPERATURE REGULATOR.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

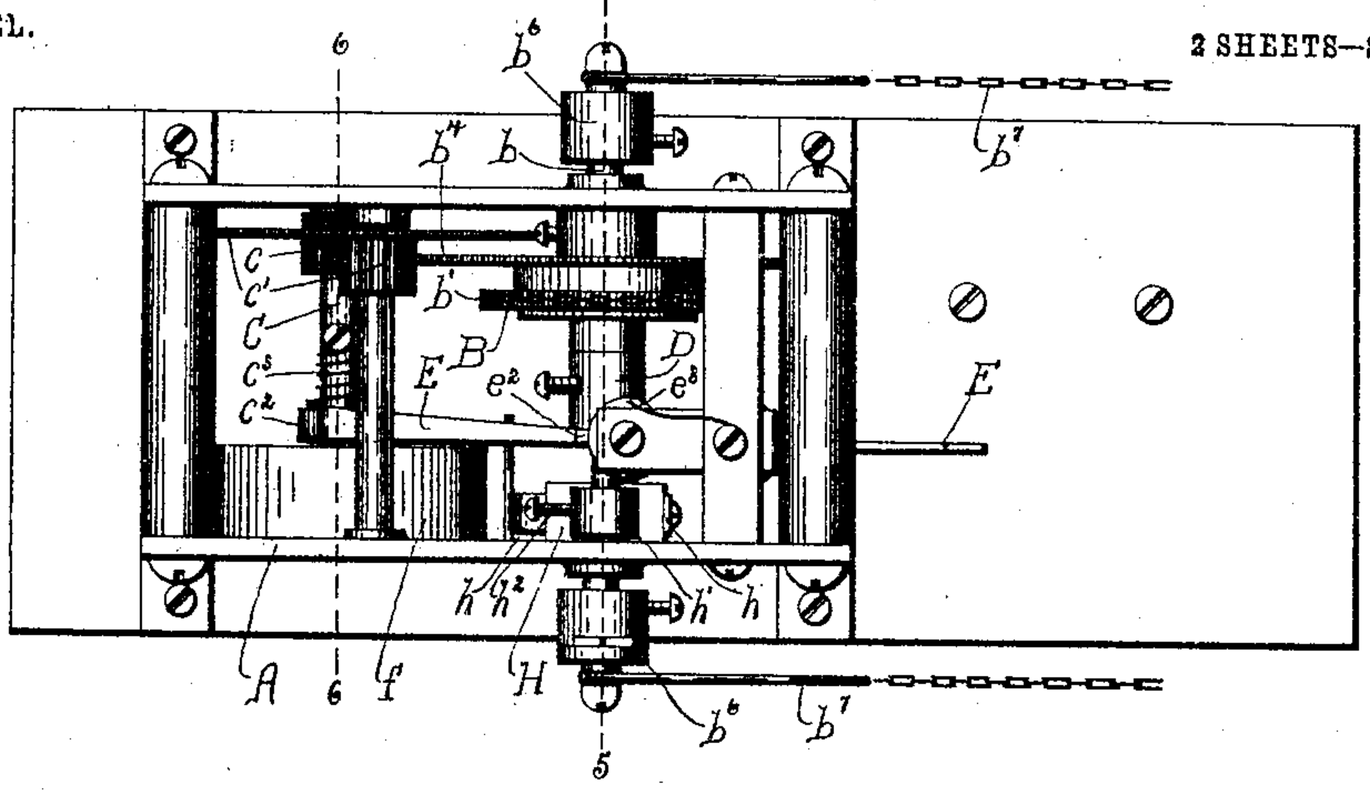

Fig. 5.

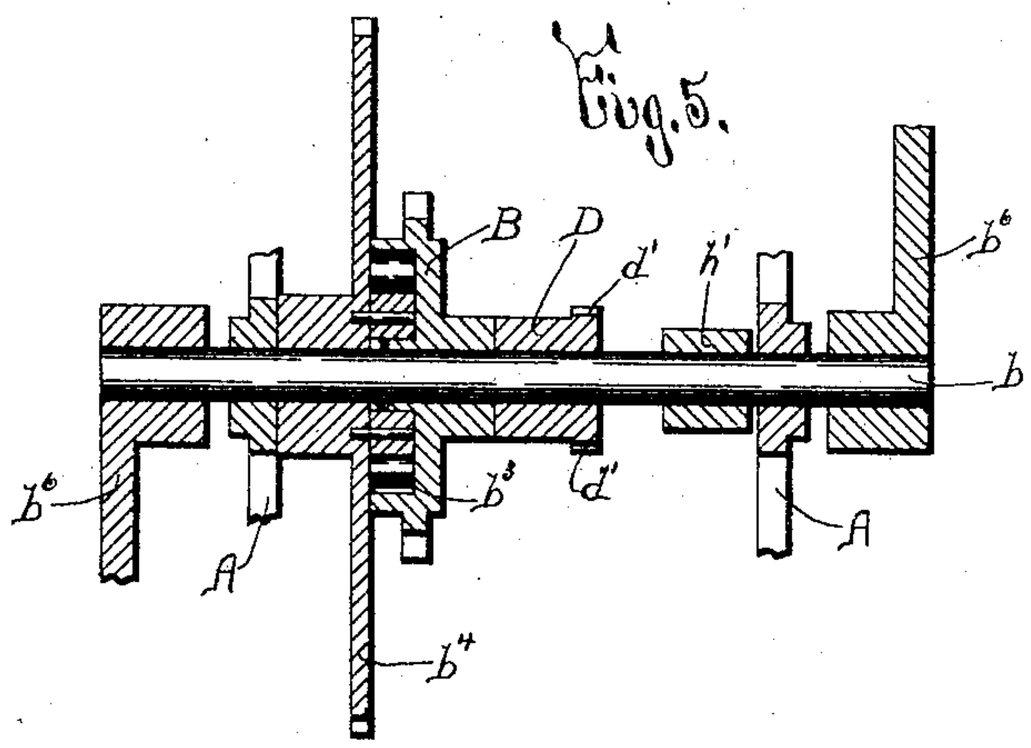

Fig. 6.

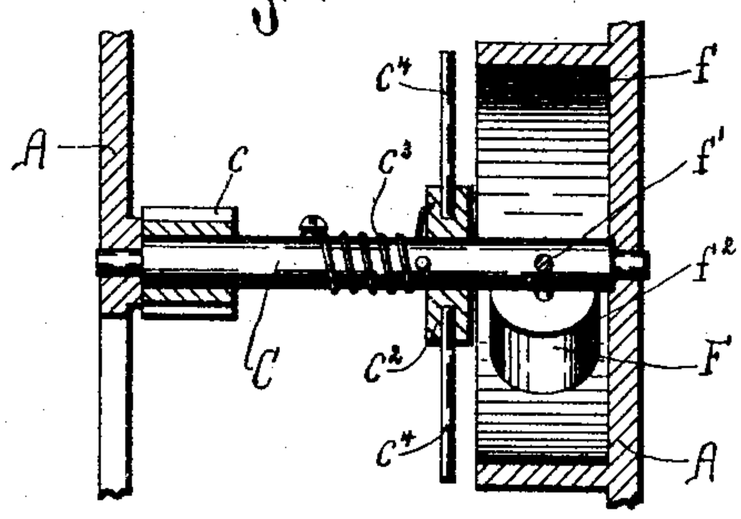

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PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 774,882. Patented November 15, 1904.

UNITED STATES PATENT OFFICE.

CHARLES E. JEWELL, OF AUBURN, NEW YORK.

TEMPERATURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 774,882, dated November 15, 1904.

Application filed August 20, 1902. Serial No. 120,365. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. JEWELL, of Auburn, in the county of Cayuga and State of New York, have invented a certain new and useful Temperature-Regulator, of which the following is a specification.

My invention has for its object the production of a temperature-regulator which is particularly simple in construction and durable and effective in use; and to this end it consists in the novel combinations and constructions hereinafter fully described, and pointed out in the claims.

Figure 1 is an elevation, partly broken away, of my temperature-regulator shown as operatively connected to a heat-controlling device, the normally open electric circuit and its battery being illustrated diagrammatically, the heat-controlling device being shown on a reduced scale and parts of the connections to said device and also to the means for operating the driving member being omitted. Fig. 2 is a rear view of the thermostatic circuit-closer. Fig. 3 is a sectional view taken on line 3 3, Fig. 1. Fig. 4 is a top plan of parts seen in Fig. 1. Figs. 5 and 6 are sectional views taken, respectively, on lines 5 5 and 6 6, Fig. 4.

My temperature-regulator embodies in its construction a frame A, driving and driven members B C, and means for normally preventing and for controlling the rotation of said driving and driven members.

The frame A is of any desirable form, size, and construction, being usually formed of metal or a conductor of electricity.

In the preferable construction of my invention the driving member B consists of a sprocket-wheel, which is loosely mounted on a shaft b, journaled in the frame A and is rotated by a chain b', provided at one end with a weight b^2. Said shaft b is connected to the driving member B by a suitable clutch b^3, is provided with a gear or other power-transmitting member b^4, fixed thereto, and is connected in any desirable manner to a suitable heat-controlling device b^5, being here shown as provided with oppositely-arranged crank-arms b^6, pivoted to connections b^7, secured to crank-arms b^8, provided on the heat-controlling device b^5. The clutch b^3 is of any well-known form, as a ball-clutch, for locking the driving member B to the shaft b when said member is moving forwardly and for permitting the driving member to move rearwardly without rotating the shaft b. It is therefore thought unnecessary to further describe said clutch.

The driven member C usually consists of a shaft provided with a gear or power-transmitting member c, connected to the gear or power-transmitting member b^4 by suitable intermediate gearing c' for revolving said driven member at greater speed than the driving member B. Said driven member C is generally provided with an engaging part c^2, which is arranged with its axis substantially coincident with the axis of the driven member, is movable relatively to the driven member for a limited distance, is yieldingly connected thereto by a spiral spring c^3, having one end connected to the member C and its other end connected to the engaging part c^2, and is provided with oppositely-arranged yielding arms c^4, each having its outer end extended in the direction of movement of said actuating part for facilitating the practical engagement of said arms.

As preferably constructed the means for normally preventing the rotation of the driving and driven members B C consists of a disk D, revoluble with the shaft b, and a detent E. Said disk D is fixed to the shaft b in any desirable manner and is provided with a bearing-face d and with opposite sockets d', extending inwardly from said face. One end of the detent is pivoted to the frame A. Its other end is provided with a depending shoulder e for normally engaging one of the arms c^4 and preventing rotation of the driving and driven members, and its intermediate portion is formed with a shoulder e', which engages the face d and enters the sockets d', and with an armature e^2, attracted by an electromagnet e^3, connected to a normally open circuit e^4 and a battery e^5 or other suitable source of electric energy. When the detent E is in its normal position, the shoulder e' is arranged in one of the sockets d' and the shoulder e is in operative position in engagement with one

of the arms c^4 for preventing rotation of the driving and driven members B C and the engaging part c^2, and as the electromagnet e^3 is energized the free end of the detent is elevated, thus disengaging the shoulder e from the arm c^4, withdrawing the shoulder e' from the socket d' and permitting rotation of the driving and driven members and the engaging part. During the rotation of said members B C and engaging part c^2 the shoulder e' rides upon the face d of the disk D until one of the sockets d' is alined with the shoulder e', whereupon the free end of the detent E falls automatically by gravity and the shoulder e is engaged by one of the arms c^4 and prevents further rotation of the driving and driven members and the engaging part.

The means for controlling the rotation of the driving and driven members B C is here illustrated as consisting of a governor F, a thermostatic circuit-closer G, and circuit-breakers H I. Said governor F comprises a hollow cylinder f, arranged concentric with the driven member C and fixed to the frame A, opposite arms f', projecting laterally from the driven member, and friction-pieces f^2, loosely mounted on the arms f' and movable endwise thereon into and out of engagement with the inner face of the hollow cylinder f. As will be obvious to those skilled in the art, the governor F compels the driving and driven members B C to rotate at a substantially uniform and predetermined speed.

As here shown, (see Figs. 1 and 2,) the thermostatic circuit-closer G consists of a support g, terminals g' g'', fixed to the support g and connected to the circuit e^4, a thermostatic member g^2, connected to the circuit e^4, arranged on one side of the support g and having one end pivoted to said support and its other end movable between the terminals g' g'' into engagement therewith, an arm g^3, arranged on the other side of the support g and having one extremity fixed to the pivoted end of the thermostatic member g^2, and an indicator g^4, pivoted to the support g, for adjusting the member g^2 relatively to the terminals g' g'' and having substantially parallel arms arranged on opposite sides of the support g, one arm being movable along a suitable scale g^5, representing different degrees of temperature, on the support g for indicating the degree of temperature desired to be maintained and the other arm being pivoted at g^6 to the free end of the arm g^3. The electric conductors of the normally open circuit e^4 are so arranged and connected to the terminals g' g'' and the thermostatic member g^2 that whenever the member g^2 makes contact with one of the terminals g' g'' an electric current flows from the battery e^5 through said circuit and energizes the electromagnet e^3, and as the arrangement and connection of said conductors form no part of my present invention and will be apparent to those skilled in the art it is thought unnecessary to further describe the same herein. It will be noted, however, that the circuit e^4, the magnet e^3, and the thermostatic circuit-closer G form temperature-controlled means for automatically withdrawing the detent E from its operative position.

The circuit-breaker H is usually composed of opposite electrically-disconnected yielding terminals h h'', Figs. 1 and 4, connected, respectively, to the opposite terminals or contact-points g' g'' and a disk h' revoluble with the shaft b and provided with an arm h^2 normally engaged with one of the terminals h h'' and movable out of engagement with said terminal just before one of the sockets d' is alined with the shoulder e' of the detent E. Said circuit-breaker H deënergizes the electromagnet e^3 in order that the detent E may be free to assume its operative position.

As best seen in Figs. 2 and 3, the circuit-breaker I consists of a lever pivoted to the frame A and having one end arranged in the path of any desirable shoulder b^9 on the chain b' and its other end provided with means, as its extremity, normally arranged between two terminals i, connected in the circuit e^4. When the weight b^2 is about to reach the limit of its downward movement, the shoulder b^9 engages the contiguous end of the lever I and rocks the other end of said lever out of engagement with the terminals i, thus breaking the circuit e^4 and preventing operation of my temperature-regulator until the weight b^2 is elevated to its starting position.

In the operation of my apparatus the heat-controlling device b^5 is rotated in one direction only, being given one-half of a complete revolution in each operation or impulse of the actuating mechanism. Assuming that this device in the position in which the apparatus is shown in Fig. 1 closes the draft of the furnace, that the indicator g^4 is set at the degree of temperature desired to maintain, that the thermostatic member g^2 will move toward the terminal g' under the influence of an increase in temperature and toward g'' under influence of a decrease in temperature, and the arm h^2 is arranged in contact with the terminal h'', which is connected to the terminal g'' of the thermostatic member, the operation of the apparatus is as follows: Upon the temperature decreasing the member g^2 will move toward the terminal g'' and make contact therewith, thus closing the circuit, and the electromagnet e^3 will be energized, so that it will lift the detent E, and the drive and driven members will thus be released. These members will at once commence to rotate under the influence of the weight b^2 and will continue to rotate until again arrested by detent E. In the initial movement of the driving member the arm h^2 will be carried out of contact with terminal h'' and the circuit e^4 broken, thereby deënergizing the magnet e^3, which will immediately re-

lease the detent E. The latter will drop back; but the shoulder thereof will be held out of the path of the arms c^4 by the shoulder e' riding upon the bearing-face d until one of the sockets d^2 is brought to register with said shoulder e', which occurs as the driving member completes one-half of a complete revolution, whereupon said shoulder will enter one of the sockets d^2 and the shoulder e' will rest in the path of movement of the ends of the arm c^4. Just before the completion of the movement referred to the arm h^2 will move into contact with the terminal h, so that upon the member g^2 contacting with terminal g' upon an increase of temperature the circuit e^4 may be closed and the automatic mechanism actuated to return the device b^5 to its starting position or any position to close the draft to the furnace. As will be understood, during the turning movement of the driving member the crank-arms b^6 will move therewith and through the connections b^7 will turn the crank-arms b^8 provided on the heat-controlling device b^5.

My temperature-regulator will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be obvious to those skilled in the art that more or less change may be made in the construction and arrangement of the component parts thereof without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, means for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member and movable relatively thereto, means coöperating with the engaging part for normally preventing rotation of the driven member, and temperature-controlled means for automatically withdrawing the latter means from its normal position, substantially as and for the purpose specified.

2. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, means for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member and provided with an arm movable relatively to the driven member, a detent coöperating with the arm of the engaging part for normally preventing rotation of the driven member, and temperature-controlled means for automatically withdrawing the detent from its normal position, substantially as and for the purpose set forth.

3. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, means for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member and provided with a yielding arm having its outer end extended in the direction of movement of said part, a detent for normally engaging said end of the yielding arm and thereby preventing rotation of the driven member, and temperature-controlled means for automatically withdrawing the detent from its normal position, substantially as and for the purpose described.

4. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, means for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member, yielding means between the driven member and the engaging part, means coöperating with the engaging part for normally preventing rotation of the driven member, and temperature-controlled means for automatically withdrawing the latter means from its normal position, substantially as and for the purpose specified.

5. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a rotary member connected to the heat-controlling device for operating the same, means for actuating the rotary member, an engaging part revoluble with the rotary member, yielding means between the rotary member and the engaging part, a detent coöperating with the engaging part for normally preventing rotation of said rotary member, and temperature-controlled means for automatically withdrawing the detent from its normal position, substantially as and for the purpose set forth.

6. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a rotary member connected to the heat-controlling device for operating the same, means for actuating the rotary member, an engaging part revoluble with the rotary member and having its axis substantially coincident therewith, a spiral spring having one end connected to the rotary member and its other end connected to the engaging part, a detent coöperating with the engaging part for normally preventing rotation of said rotary member, and temperature-controlled means for automatically withdrawing the detent from its normal position, substantially as and for the purpose described.

7. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, means

for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member, yielding means between the driven member and the engaging part, a detent having one end pivoted to the frame, its other end provided with a depending shoulder for encountering the engaging part and preventing rotation of the driven member and its intermediate portion formed with an armature, an electromagnet for the armature, a normally open circuit connected to the electromagnet, and a thermostatic circuit-closer for said circuit, substantially as and for the purpose described.

8. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, a disk revoluble with the driving member and provided with a bearing-face and a socket, means for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member and movable relatively thereto, a detent for normally encountering the engaging part and preventing rotation of the driven member, said detent being provided with a shoulder normally arranged in the socket of the disk and engaged with said bearing-face when withdrawn from the socket, and temperature-controlled means for automatically withdrawing the detent from its normal position, substantially as and for the purpose described.

9. In a temperature-regulator, the combination with a heat-controlling device; of a frame, a driving member connected to the heat-controlling device for operating the same, means for rotating the driving member, a driven member connected to the driving member and revoluble therewith, an engaging part revoluble with the driven member and movable relatively thereto, a hollow cylinder arranged concentric with the driven member and fixed to the frame, an arm projecting laterally from the driven member, a friction-piece loosely mounted on the arm and movable endwise thereon into and out of engagement with the inner face of the hollow cylinder, means cooperating with the engaging part for normally preventing rotation of the driven member, and temperature-controlled means for automatically withdrawing the latter means from its normal position, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 15th day of August, 1902.

CHARLES E. JEWELL.

Witnesses:
F. T. MILLER,
F. G. BODELL.